DR. A. JOSEPH NATHANAEL

About the Faculty:

Dr. A. Joseph Nathanael's research is lies at the cross roads of physics, materials science, chemistry and biomaterials. He received his PhD in Physics from Bharathiar University, India in 2010. He has more than 10 years of overseas research experience at various capacity (South Korea, Japan and Taiwan). He was awarded prestigious JSPS fellowship and worked in National Institute of Advanced Industrial Science and Technology (AIST), one of the largest research institutes in Japan. He is also awarded with Ramalingaswami Re-entry fellowship in 2020 from the Department of Biotechnology, Government of India. Currently he is working as an Associate Professor in the Center for Biomaterials, Cellular and Molecular Theranostics (CBCMT) in Vellore Institute of Technology. He has more than 60 peer reviewed research papers to his credit. His group is working on 3D/4D bioprinting, biomaterials, environmental remediation and sensors.

Research Interests: Nano-biomaterials, smart materials, bone tissue Engineering, additive Manufacturing (3D & 4D printing), paper-based sensors, dental materials, food packaging polymers (intelligent materials) & environment al remediation.

E-mail: joseph.nathanael@vit.ac.in

Google Scholar link: https://scholar.google.com/citations?user=a2rDPvkAAAAJ&hl=en&authuser=1

LinkedIn: www.linkedin.com/in/dr-joseph-nathanael-8071a1191

Research Project: On-going:

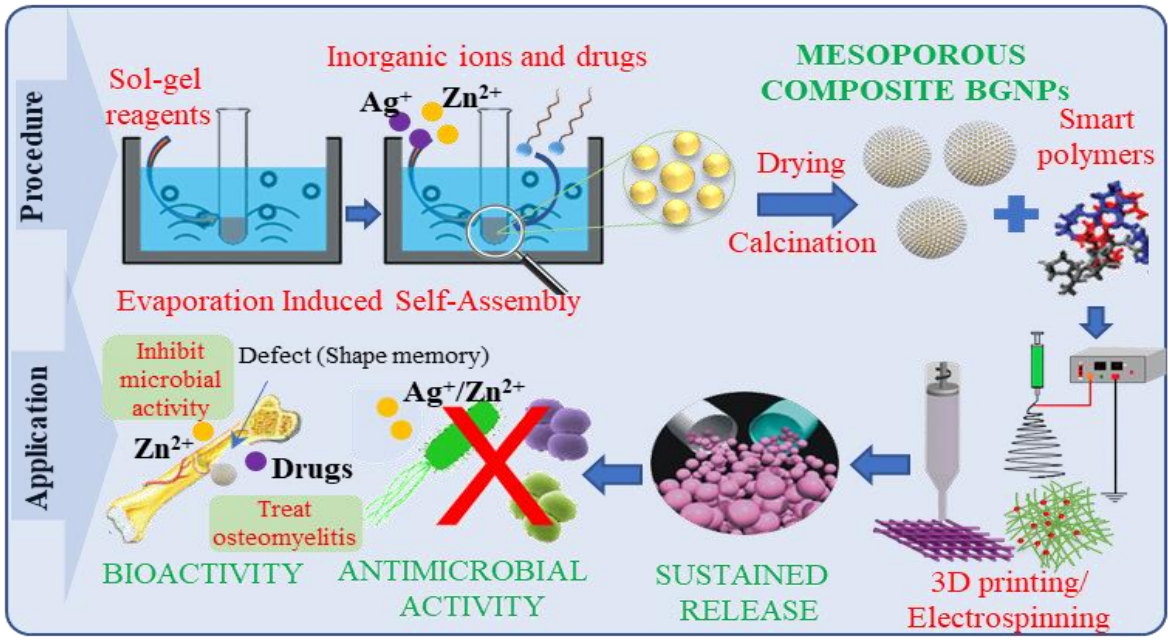
Title: Four dimensional (4D) bioprinting of smart nanocomposite artificial bone ECM with shape memory and programmable therapeutic delivery functions

Funding Agency: DBT

Scheme: Ramalingaswami Re-entry Fellowship

Overlay: 1,13,60,000

Duration of the Project: 5 Years



Publication list:

S.No	Author(s)	Title	Name of the Journal	Volume	Page	Year	IF
60	S. Manoj, R. Sreena, R. Divya, S. Ebinesh, S. Akshaya, S. S. Angel, **A J. Nathanael**	Nanomaterial-Enhanced Dentistry: A Clinical Perspective	ACS Biomaterials Science & Engineering	Minor revision submitted on 11th June 2025.			**5.5**
59	S. Akshaya, **A J. Nathanael**	Influence of amino silane-modified nanocellulose on the physico-chemical and mechanical properties of alginate films	Materials Advances	**6**	4313	2025	**5.2**
58	A. Raheem, K. Mandal, S. Biswas, A. Ahari, A. H. Najafabadi, N. Farhadi, F. Zehtabi, A. Gangrade, M.	Smart biomaterials in healthcare: Breakthroughs in tissue engineering, immunomodulation, patient-specific therapies, and biosensor applications	Applied Physics Reviews	12	011333	2025	**11.9**

	Mecwan, S. Maity, S. Sharma, **A. J. Nathanael**, P. A. Khan, A. Udduttula, N. H. Kouchehbaghi, D. Khorsandi, R. Vasita, R. Haghniaz, R. D. Herculano, J. V John, H. Kim, M. R. Dokmeci, K. C Popat, Y. Zhu, G. Manivasagam						
57	R Sreena, G. Raman, G. Manivasagam, **AJ Nathanael**	Bioactive Glass-Polymer Nanocomposites: A comprehensive Review on Unveiling its Biomedical Applications	Journal of Materials Chemistry B	12	11278	2024	**6.1**
56	GS Lekshmi, A Krzemińska, S Sundararaju, SJ Hinder, A Zatylna, P. Paneth, J. Pietrasik, C. Sudip, W. Hendrickx, **A J. Nathanael,** B. Januszewicz, L. Kolodziejczyk, L. Kaczmarek, V. Kumaravel	Engineering of brewery waste-derived graphene quantum dots with ZnO nanoparticles for treating multi-drug-resistant bacterial infections.	Journal of Environmental Chemical Engineering	12	112263	2024	**7.7**
55	S Akshaya, AJ Nathanael	A Review on Hydrophobically Associated Alginates: Approaches and Applications	ACS omega	9 (4)	4246-4262	2024	**4.1**
54	R. Sreena, **A.J. Nathanael**	Biodegradable Biopolymeric Nanoparticles for Biomedical Applications-Challenges and Future Outlook	Materials	16	2364	**2023**	**3.748**
53	S. Akshaya, P. K. Rowlo, A. Dukle, **A. J.**	Antibacterial Coatings for Titanium Implants: Recent	Antibiotics	11	1719	**2022**	**5.22**

	Nathanael	Trends and Future Perspectives					
52	T. H. Oh, D. S. Shin, Y.M. Im, Y.H. Seo, **A.J. Nathanael,** Y. J. Kim, J. H. Jeon, K. H. Kim, J. H. Jung, I. S. Choi	Experimental and Molecular Dynamics Studies on Tensile Properties of Nylon 6/Graphene Composite Filaments	Fibers and Polymers	23	1684 – 1691	**2022**	**2.347**
51	C Ravi Dhas, SE Santhoshi Monica, R Venkatesh, R Sivakumar, **A J. Nathanael,** R Vignesh, D Arivukarasan, KC Mercy Gnana Malar, S Keerthana	Correlation of annealing temperature on physico-chemical properties and electrochromic performance of nebulizer spray-coated NiO films	Inorganic and Nano-Metal Chemistry	53	1-13	**2023**	**1.716**
50	A Dukle, D Murugan, **A. J. Nathanael,** L Rangasamy, TH Oh	Can 3D-Printed Bioactive Glasses Be the Future of Bone Tissue Engineering?	Polymers	14	1627	**2022**	**4.967**
49	Y. M. Im, **A. J. Nathanael**, M. H. Jung, S. O. Lee, T. H. Oh	Effect of Polyethylene Glycol on Melt Spinning of Poly (Acrylonitrile-co-1-Vinylimidazole)	Fibers and Polymers	23	321-326	**2022**	**2.347**
48	Y. Kanemoto, H. Miyaji, E. Nishida, S.Miyata, K. Mayumi, Y. Yoshino, A. Kato, T. Sugaya, T. Akasaka, A. J. Nathanael, S. Santhakumar, A. Oyane	Periodontal tissue engineering using an apatite/collagen scaffold obtained by a plasma-and precursor-assisted biomimetic process	Journal of Periodontal Research	57	205	**2022**	**3.946**
47	CR Dhas, S Monica, K Jothivenkatachalam, AJ Nathanael, V Kavinkumar, R Venkatesh, D Arivukarasan	Direct-grown nebulizer-sprayed nickel-copper mixed metal oxide nanocomposite films as bifunctional electrocatalyst for water splitting	Ionics	28	383	**2021**	**2.961**

46	C Kalirajan, A Dukle, AJ Nathanael, TH Oh, G Manivasagam	A Critical Review on Polymeric Biomaterials for Biomedical Applications	Polymers	13	3015	**2021**	**4.967**
45	A J. Nathanael, K. Kannaiyan, K. Aruna, S. Ramakrishna, V. Kumaravel	Global opportunities and challenges on net-zero CO_2 emissions towards a sustainable future	Reaction Chemistry & Engineering	6	2226	**2021**	**5.20**
44	A Devi VK, R Shyam, A Palaniappan, AK Jaiswal, TH Oh, AJ Nathanael	Self-healing hydrogels: Preparation, mechanism and advancement in biomedical applications	Polymers	13	3782	**2021**	**4.967**
43	***A. J. Nathanael****, T. H. Oh,	Encapsulation of Calcium Phosphates on Electrospun Nanofibers for Tissue Engineering Applications	Crystals	11	199	**2021**	**2.670**
42	***A. J. Nathanael****, T. H. Oh,	Biopolymer Coatings for Biomedical Applications	Polymers	12	3061	**2020**	**4.967**
41	Y. M. Im, H. M. Choi, ***A. J. Nathanael***, M. H. Jeong, S. O. Lee, S. N. Yun, T. H. Oh	Effects of Glycerol on Melt Spinning of Polyacrylonitrile Copolymer and Tetrapolymer,	Fibers and Polymers	21	376	**2020**	**2.347**
40	***A. J. Nathanael****, Y. M. Im, T. H. Oh	Effect of Anionic Surfactant on the Morphology of the Hydroxyapatite Nanoparticles and its Structural and Biological Properties	Advanced Powder Technology	31	234	**2020**	**4.969**
39	A. Oyane, N. Saito, I. Sakamaki, K. Koga, M. Nakamura, ***A. J. Nathanael,*** N. Yoshizawa, K. Shitomi, K. Mayumi, H. Miyaji.	Laser-assisted biomineralization on human dentin for tooth surface functionalization	Materials Science & Engineering C	105	110061	**2019**	**7.328**

38	Y. J. Kim, H. M. Choi, S. H. Jang, K. H. Min, ***A. J. Nathanael***, T. H. Oh.	Effect of encapsulation with zeolite and coating with TiO_2 on the thermal stability of caffeine during melt extrusion of a PET/TiO_2@(zeolite/caffeine) nanocomposite	Advanced Powder Technology	30	854	**2019**	**4.969**
37	***A. J. Nathanael***, A. Oyane, M. Nakamura, M. Mahanti, K. Koga, K. Shitomi, H. Miyaji.	Rapid and area-specific coating of fluoride-incorporated apatite layers by a laser-assisted biomimetic process for tooth surface functionalization	Acta Biomaterialia	79	148-157	**2018**	**10.633**
36	***A. J. Nathanael***, A. Oyane, M. Nakamura, K. Koga, E. Nishida, S. Tanaka, H. Miyaji.	Calcium phosphate coating on dental composite resins by a laser-assisted biomimetic process	Heliyon,	4	e00734	**2018**	**3.776**
35	G. S. Kim, ***A. J. Nathanael***, Y. J. Kim, T. H. Oh..	Preparation of TiO_2-coated ZnO nanoparticles and their effect on the UV absorption of a poly(vinyl alcohol) composite film	Fibers and Polymers	19	1747	**2018**	**2.347**
34	***A. J. Nathanael****, A. Oyane, M. Nakamura, I. Sakamaki, E. Nishida, Y. Kanemoto, H. Miyaji.	In vitro and in vivo analysis of mineralized collagen based sponges prepared by a plasma and precursor assisted biomimetic process.	ACS Applied Materials and Interfaces	9	22185	**2017**	**10.383**
33	***A. J. Nathanael***, S. I. Hong, T. H. Oh, Y. H. Seo, D. Singh, S. S. Han	Enhanced cell viability of hydroxyapatite nanowires by surfactant mediated synthesis and its growth mechanism.	RSC Advances	6	25070	**2016**	**4.036**
32	K. P. Ananth, ***A. J. Nathanael***, S. P. Jose, T. H. Oh, D. Mangalaraj	A novel silica nanotube reinforced ionic incorporated hydroxyapatite composite coating on polypyrrole coated 316L SS for implant application.	Materials Science & Engineering C	59	1110	**2016**	**7.328**
31	K.P. Anand, S. Jose, ***A.J. Nathanael***, T.H. Oh, D.	A novel modified sol-gel template synthesis of high aspect ratio silica	Journal of Nano Research.	35	27	**2016**	**2.929**

	Mangalaraj, A.M. Ballamurugan,.	nanotubes in the presence of phosphoric acid.					
30	K. P. Ananth, ***A. J. Nathanael,*** S. P. Jose, T. H. Oh, D. Mangalaraj, A.M. Ballamurugan,	Controlled electrophoretic deposition of HAp/β-TCP composite coatings on piranha treated 316L SS for enhanced mechanical and biological properties.	Applied Surface Science	353	189	**2015**	**7.392**
29	K. P. Ananth, S. Shanmugam, S. P. Jose, ***A. J. Nathanael,*** T. H. Oh, D. Mangalaraj and A.M. Ballamurugan..	Structural and chemical analysis of silica doped β-TCP ceramic coatings on surgical grade 316L SS for possible biomedical application.	Journal of Asian Ceramic Societies	3	317	**2015**	**3.125**
28	***A.J. Nathanael***, Y.M. Im, T.H. Oh, R. Yuvakkumar, D. Mangalaraj,.	Biomimetic hierarchical growth and self-assembly of hydroxyapatite/titania nano-composite coatings and their biomedical applications.	Applied Surface Science	332	368	**2015**	**7.392**
27	***A.J. Nathanael***, Y.H. Seo, T.H. Oh,.	PVP Assisted synthesis of hydroxyapatite nanorods with tunable aspect ratio and bioactivity.	Journal of Nanomaterials	2015	621785	**2015**	**3.791**
26	Y.M. Im, T.H. Oh, ***A.J. Nathanael***, S.S. Jang	Effect of ZnO nanoparticles morphology on UV blocking of poly(vinyl alcohol)/ZnO composite nanofibers.	Materials Letters	147	20	**2015**	**3.574**
25	R. Yuvakkumar, J. Suresh, B. Saravanakumar, ***A. J. Nathanael,*** S. I. Hong, V. Rajendran,	Rambutan peels promoted biomimetic synthesis of bioinspired zinc oxide nanochains for biomedical applications.	Spectrochimica Acta Part A-Molecular and Biomolecular Spectroscopy	137	250	**2015**	**4.831**
24	R. Yuvakkumar, P. Peranantham, ***A. J. Nathanael,*** D. Nataraj, D. Mangalaraj, S. I. Hong,.	Macroparticles reduction using filter free cathodic vacuum arc deposition method in ZnO thin films.	Journal of Nanoscience and Nanotechnology	15	2523	**2015**	**1.354**
23	K.P. Anand, S. Jose, ***A.J. Nathanael***, T.H. Oh, D.	Biomimetic ion substituted hydroxyapatite coating on surgical grade 316L SS for implant applications.	Advanced Materials Letters	6	984	**2015**	**1.83**

	Mangalaraj, A.M. Ballamurugan,.						
22	***A.J. Nathanael***, R. Yuvakkumar, S.I. Hong, T.H. Oh,.	Novel zirconium nitride and hydroxyapatite nanocomposite coating: Detailed analysis and functional properties.	ACS Applied Materials & Interfaces	6	9850	**2014**	**10.383**
21	***A.J. Nathanael***, J.H. Lee, D. Mangalaraj, S.I. Hong, T.H. Oh.	Influence of processing method on the properties of hydroxyapatite nanoparticles in the presence of different citrate ion concentrations.	Advanced Powder Technology	25	551	**2014**	**4.969**
20	Y.M. Im, T.H. Oh, J.W. Cha, Y.H. Seo, J.S. Hwang, ***A.J. Nathanael*****,** S.S. Han, S.H. Jang.	Preparation of poly(vinyl alcohol)/ZrO_2 composite nanofibers via co-axial electrospinning with higher ZrO_2 particle content.	Fibers and Polymers	15	2066	**2014**	**2.347**
19	R. Yuvakkumar, ***A.J. Nathanael***, S.I. Hong.	Inorganic complex intermediate Co_3O_4 nanostructures using green ligation from natural waste resources.	RSC Advances	4	44495	**2014**	**4.036**
18	R. Yuvakkumar, J. Suresh, ***A.J. Nathanael***, M. Sundrarajan, S.I. Hong.	Novel green synthetic strategy to prepare ZnO nanocrystals using rambutan (Nephelium lappaceum L.) peel extract and its antibacterial applications.	Materials Science and Engineering C	41	17	**2014**	**7.328**
17	R. Yuvakkumar, J. Suresh, ***A.J. Nathanael***, M. Sundrarajan, S.I. Hong.	Rambutan (Nephelium lappaceum L.) peel extract assisted biomimetic synthesis of nickel oxide nanocrystals.	Materials Letters	128	170	**2014**	**3.574**
16	R. Yuvakkumar, ***A. J. Nathanael***, V. Rajendran, S. I. Hong.	Rice husk ash nanosilica to inhibit human breast cancer cell line (3T3).	Journal of Sol-Gel Science and Technology	72	198	**2014**	**2.606**
15	S. R. Kumar, L. Marianna, S. Gianni, ***A J. Nathanael***, S.I. Hong, T.H. Oh, D. Mangalaraj, C. Viswanathan, N. Ponpandian.	Hydrophilic polymer coated monodispersed Fe_3O_4 nanostructures and their cytotoxicity.	Materials Research Express	1	015015	**2014**	**2.025**
14	***A.J. Nathanael***, S. Han, T.H. Oh.	Polymer assisted hydrothermal synthesis of	Journal of Nanomaterials	2013	962026	**2013**	**3.791**

		hierarchically arranged hydroxyapatite nanoceramic.					
13	***A J. Nathanael***, D. Mangalaraj, S.I. Hong, Y. Masuda, Y.H. Rhee, H.W. Kim.	Influence of fluorine substitution on the morphology and structure of hydroxyapatite nanocrystals prepared by hydrothermal method.	Materials Chemistry and Physics	137	967	**2013**	**4.778**
12	***A.J. Nathanael***, S.I. Hong, D. Mangalaraj, N. Ponpandian, P.C. Chen.	Template free growth of novel hydroxyapatite nanorings: formation mechanism and their enhanced functional properties	Crystal Growth & Design	*12*	3565	**2012**.	**4.010**
11	***A.J. Nathanael***, J.H. Lee, D. Mangalaraj, S.I. Hong, Y.H. Rhee	Multifunctional activity of hydroxyapatite / titania bio-nano-composites: bioactivity and antimicrobial studies	Powder Technology	228	410	**2012**	**5.64**
10	***A.J. Nathanael***, J.H. Lee, S.I. Hong.	Effect of processing parameters on the mechanical reliability of ZrN/ hydroxyapatite nanocomposite coatings	Advanced Science Letters	15	285	**2012**	**-**
9	H. Y. Kwak, K. H. Lee, ***A. J. Nathanael,*** S. I. Hong.	Mechanical properties of Cu-Ag micro-composites thermo-mechanically processed by equal channel angular pressing (ECAP)	Advanced Science Letters	14	849	**2012**	**-**
8	***A.J. Nathanael***, S.I. Hong, D. Mangalaraj, P.C. Chen	Large scale synthesis of hydroxyapatite nanospheres by high gravity method.	Chemical Engineering Journal	173	846	**2011**	**16.744**
7	***A.J. Nathanael***, D. Mangalaraj, P.C. Chen, N. Ponpandian	Enhanced mechanical strength of hydroxyapatite nanorods reinforced with polyethylene.	Journal of Nanoparticle Research	13	1841	**2011**	**2.533**
6	***A.J. Nathanael***, D. Mangalaraj, S.I. Hong, Y. Masuda	Synthesis and in-depth analysis of highly ordered yttrium doped hydroxyapatite nanorods prepared by hydrothermal	Materials Characterization	62	1109	**2011**	**4.537**

		method and its mechanical analysis					
5	J.M. Lee, ***A. J. Nathanael***, P.W. Shin, S.I. Hong, Y.H. Jeong,	Mechanical and Oxidation Properties of Cold-Rolled Zr-Nb-O-S Alloys	Korean Journal of Materials Research	21	161	**2011**	**-**
4	***A.J Nathanael***, D. Mangalaraj, P.C. Chen, N. Ponpandian	Mechanical and photo-catalytic properties of hydroxyapatite/titania nanocomposites prepared by combined high gravity and hydrothermal process	Composites Science and Technology	70	419	**2010**.	**9.879**
3	***A. J. Nathanael***, D. Mangalaraj, N. Ponpandian,	Controlled growth and investigations on the morphology and mechanical properties of hydroxyapatite/titania nanocomposite thin films	Composites Science and Technology	70	1645	**2010**.	**9.879**
2	***A. J. Nathanael***, N. S. Arul, N. Ponpandian, D. Mangalaraj, P. C. Chen.	Nanostructured leaf like hydroxyapatite/TiO_2 composite coatings by simple sol-gel method	Thin Solid Films	518	7333	**2010**	**2.358**
1	***A. J. Nathanael***, D. Mangalaraj, P.C. Chen, D. Nataraj.	Improved mechanical property of hydrothermally synthesized hydroxyapatite nanorods reinforced with polyethylene	International Journal of Modern Physics B	24	215	**2010**	**1.404**

Professional Recognitions/ Awards

S.No	Name of Award	Awarding Agency	Year
1	Visiting Research Scholar	Ministry of Higher Education, Taiwan	2008
2	Junior Research Fellowship	DRDO	2009
3	Brain – Korea (BK21) Post-Doctoral Fellowship	Korean Ministry of Education and Human Resources	2010
4	Japan Society for the Promotion of Science (JSPS) Fellowship	Japan Society for the Promotion of Science (JSPS)	2015
5	Ramalingaswami Re-entry Fellowship	Department of Biotechnology, India	2020

Details of Patents

S.No	Patent Title	Name of Applicant(s)	Patent No.	Award Date	Agency/Country	Status
1	A method of manufacturing a zinc oxide nano powders	S. I. Hong, J. Suresh, R. Yuvakkumar, ***A. J. Nathanael***, M. Sundararajan	10-2016-1617994	October 2016	South Korea	Awarded

Book Chapters

S. No	Title	Author's Name	Publisher	Year of Publication
4	Photodegradation of Air Pollutants in Photocatalysis	A Joseph Nathanael, Tae Hwan Oh	De Gruyter	2021
3	Composite nanocoatings for environmental remediation	P. Suresh Kumar, ***A. J. Nathanael***,	Springer Nature Singapore Pte Ltd.	**2021**
2	Chapter 8 "*Nanomaterials for detection and removal of gases*" in "Nanomaterials for Sustainable Energy and Environmental Remediation" Ed. Mu. Naushad, R. Saravanan, K. Raju	*A. J. Nathanael*, K. Kannaiyan, A. K. Kunhiraman, K. Vignesh,	Materials Today, Elsevier, The Netherlands, (ISBN: 978-0-12-819355-6).	**2020** Pg: 219-260
1	Chapter 6: "*Designing Smart Nanotherapeutics*" in "Toxicity of Nanomaterials: Environmental and health care applications"	*A. J. Nathanael*, T. H. Oh, V. Kumaravel, Eds: S.C. Pillai, Y. Lang.	CRC Press, Taylor and Francis Group, UK .	**2019** Pg: 139-162